# PEP: An Information and Decision Support System for Osteoarthritis Patients

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Members of the Medical Informatics Group and the Department of Physical Therapy, University of Missouri-Columbia, have developed a multimedia information and decision support system, called PEP, to serve the needs of osteoarthritis patients in a managed care setting.[1] The PEP system provides personalized information and support for wellness decision making based on a computer-performed assessment of the strength and flexibility of the patient's knees and hips.

The knee and hip assessment consists of a series of questions that each requires the patient to perform some movement or task, e.g., *While sitting in the chair, are you able to hold your leg out straight in front of you for 15 seconds without quivering?* Each assessment question is presented using text, sound, graphics, and where appropriate, video. Using the results of the assessment as an information needs profile, the PEP system provides the patient with information about exercise, medications, the functions of various health professionals, assistive devices, and joint replacements. This information is provided in the form of text, sound, graphics and video.

Personalization of instruction is a basic principle of good instructional design.[2] Exercise has been shown to be an effective therapy for osteoarthritis.[3,4] The most important function of the PEP system is the production of a personalized, take-home exercise package. The take-home exercise package includes a personalized exercise video and a personalized exercise manual. Based on the patient's knee and hip assessment, and also based on the patient's preferences for lying down, sitting, or standing exercise positions, the PEP system recommends a set of exercises. Digital videos of these exercises are stored on the PEP system's hard disk. The PEP system assembles the digital videos of the recommended exercises and automatically records them for the patient on a patient provided video cassette. The personalized exercise manual describes the recommended exercises in text and graphics.

The PEP system provides information to patients in order to support wellness decision making in a managed care context. Since exercise has been shown to be an effective therapy for osteoarthritis, the PEP system underscores the importance of exercise information in the patient's decision making process. For example, if a patient's assessment indicates joint problems, the PEP system informs the patient of the possibility of delaying joint replacement through proper exercise. The personalized, take-home exercise package constitutes a tangible resource that may reinforce the patient's decision to pursue exercise as a possible alternative to joint replacement.

The PEP system was developed on a Gateway P5-60 60MHz Pentium computer with 64M RAM and two 500M hard disks. A 21" IDEK monitor with a Carroll Touch System's touch frame was employed to facilitate the use of the system by patients. We use a Sound Blaster 16 sound card attached to Labtec CS-550 speakers. The printer for the system is an HP LaserJet 4L. A Panasonic AG-5700 (industrial VCR) controlled by the computer is used to create the exercise video. The computer's video output is sent to the VCR by means of a Boffin VIP-200 VGA to NTSC converter. We used an ATI Video-It! to digitize our original video sequences.

The PEP system was written in Visual Basic 3.0 Professional using the Video for Windows Software Development Kit (SDK) The exercise manual is formatted and printed with WordPerfect for Windows 6.0a. Illustrations for the exercise manual were created with Mannequin Designer. The computer runs Windows for Workgroups 3.11.

References

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